What is claimed is:

1. A method of detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by one or more physical manifestations differentiating it from normal tissue, comprising:

acquiring spatial data with respect to the region of interest using at least three separate probing methods, each probing method being of the type that senses the presence of malignant tissue within the region of interest by sensing at the presence of a physical manifestation associated with the malignant tissue; and

co-registering the acquired spatial data from all of the probing methods so as to improve the receiver operating characteristics of detection performance.

2. A method of claim 1, wherein at least one of the probing methods is ultrasonic, and acquiring spatial data includes receiving backscattered signals from the tissue.

3. A method of claim 1, wherein at least one of the probing methods is ultrasonic, and acquiring spatial data includes receiving transmitted signals through the tissue in the region of interest.

4. A method of claim 1, wherein at least one of the probing methods is ultrasonic, and acquiring spatial data includes receiving backscattered and transmitted signals through the tissue in the region of interest.

5. A method of claim 1, wherein acquiring spatial data with respect to the region of interest includes compounding so as to acquire independent samples of an image point so as to reduce speckle.

6. A method of claim 5, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

7. A method of claim 5, wherein compounding includes obtaining the independent

samples of an image point by respectively using different angular aspects.

8. A method of claim 5, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

9. A method of claim 1, further including interpreting the co-registered data.

10. A method of claim 9, wherein interpreting the co-registered data includes automatically detecting data indicating the presence of malignant tissue within the region of interest.

11. A method of claim 9, wherein interpreting the co-registered data includes generating the co-registered data as image data.

12. A method of claim 11, wherein the data acquired by each modality is represented by a different color so that tissue within the region of interest is represented by a pseudo color representation.

13. A method of claim 1, wherein acquiring spatial data includes using a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data..

14. A method of claim 1, wherein acquiring spatial data includes compressing the tissue within the region of interest.

15. A method of claim 1, wherein acquiring spatial data includes using a 1D transceiver array.

16. A method of claim 1, wherein acquiring spatial data includes using a 2D transceiver array.

17. A method of claim 1, wherein there is a likelihood of detection when there is M-of-N detection.

18. A method of claim 1, wherein at least one of the probing methods is Doppler ultrasound.

19. A method of claim 1, wherein at least one of the probing methods is electromagnetic probing of dielectric permittivity.

20. A method of claim 1, wherein at least one of the probing methods is diffusive IR probing of tissue properties.

21. A method of claim 1, wherein at least one of the probing methods is photo-acoustic probing of tissue properties.

22. A method of detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by blood flow, micro-calcifications and tissue density so as to differentiate malignant tissue from normal tissue, comprising:

acquiring spatial data with respect to the region of interest using at three ultrasonic probing methods for sensing each of blood flow, micro-calcifications and tissue density of tissue within the region of interest; and

co-registering the acquired data from each of the probing methods so as to improve the receiver operating characteristics of detection performance.

23. A method of claim 22, wherein acquiring spatial data includes receiving backscattered signals from the tissue.

24. A method of claim 22, wherein acquiring spatial data includes receiving transmitted signals through the tissue in the region of interest.

25. A method of claim 22, wherein acquiring spatial data includes receiving backscattered and transmitted signals through the tissue in the region of interest.

26. A method of claim 22, wherein acquiring spatial data with respect to the region of interest includes compounding so as to acquire independent samples of an image point so as to reduce speckle.

27. A method of claim 26, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

28. A method of claim 26, wherein compounding includes obtaining the independent samples of an image point by respectively using different angular aspects.

29. A method of claim 26, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

30. A method of claim 26, further including interpreting the co-registered data.

31. A method of claim 30, wherein interpreting the co-registered data includes automatically detecting data indicating the presence of malignant tissue within the region of interest.

32. A method of claim 30, wherein interpreting the co-registered data includes generating the co-registered data as image data.

33. A method of claim 32, wherein the data acquired by each modality is represented by a different color so that tissue within the region of interest is represented by a pseudo color representation.

34. A method of claim 22, wherein acquiring spatial data includes using a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data..

35. A method of claim 22, wherein acquiring spatial data includes compressing the tissue within the region of interest.

36. A method of claim 22, wherein acquiring spatial data includes using a 1D transceiver array.

37. A method of claim 22, wherein acquiring spatial data includes using a 2D transceiver array.

38. A method of claim 22, wherein there is a likelihood of detection when there is M-of-N detection.

39. A method of claim 22, wherein at least one of the probing methods is Doppler ultrasound.

40. A method of detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by blood flow, micro-calcifications and tissue density so as to differentiate malignant tissue from normal tissue, comprising:

acquiring spatial data with respect to the region of interest using at least three probing methods for sensing each of blood flow, micro-calcifications and tissue density of tissue within the region of interest, wherein one of the probing methods is photo-acoustic for sensing blood density, and at least two are ultrasonic for sensing micro-calcifications and tissue density, respectively; and

co-registering the acquired data from each of the probing methods so as to improve the receiver operating characteristics of detection performance.

41. A method of claim 40, wherein acquiring spatial data includes receiving backscattered signals from the tissue.

42. A method of claim 40, wherein acquiring spatial data includes receiving transmitted signals through the tissue in the region of interest.

43. A method of claim 40, wherein acquiring spatial data includes receiving backscattered and transmitted signals through the tissue in the region of interest.

44. A method of claim 40, wherein acquiring spatial data with respect to the region of interest includes compounding so as to acquire independent samples of an image point so as to reduce speckle.

45. A method of claim 44, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

46. A method of claim 44, wherein compounding includes obtaining the independent samples of an image point by respectively using different angular aspects.

47. A method of claim 44, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

48. A method of claim 44, further including interpreting the co-registered data.

49. A method of claim 48, wherein interpreting the co-registered data includes automatically detecting data indicating the presence of malignant tissue within the region of interest.

50. A method of claim 48, wherein interpreting the co-registered data includes generating the co-registered data as image data.

51. A method of claim 50, wherein the data acquired by each modality is represented by a different color so that tissue within the region of interest is represented by a pseudo color representation.

52. A method of claim 40, wherein acquiring spatial data includes using a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data..

53. A method of claim 40, wherein acquiring spatial data includes compressing the tissue within the region of interest.

54. A method of claim 40, wherein acquiring spatial data includes using a 1D transceiver array.

55. A method of claim 40, wherein acquiring spatial data includes using a 2D transceiver array.

56. A method of claim 40, wherein there is a likelihood of detection when there is M-of-N detection.

57. A method of claim 40, wherein at least one of the probing methods is Doppler ultrasound.

58. A method of detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by blood density, blood flow, micro-calcifications and tissue density so as to differentiate malignant tissue from normal tissue, comprising:

acquiring spatial data with respect to the region of interest using at least four probing methods for sensing each of blood density, blood flow, micro-calcifications and tissue density of tissue within the region of interest, and

co-registering the acquired data from each of the probing methods so as to improve the receiver operating characteristics of detection performance.

59. The method of claim 58, wherein one of the probing methods is photo-acoustic for sensing blood density, and at least three are ultrasonic for sensing blood flow, micro-calcifications and tissue density, respectively.

60. A method of claim 58, wherein at least one of the probing methods is ultrasonic, and acquiring spatial data includes receiving backscattered signals from the tissue.

61. A method of claim 58, wherein at least one of the probing methods is ultrasonic, and acquiring spatial data includes receiving transmitted signals through the tissue in the region of interest.

62. A method of claim 58, wherein at least one of the probing methods is ultrasonic, and acquiring spatial data includes receiving backscattered and transmitted signals through the tissue in the region of interest.

63. A method of claim 58, wherein acquiring spatial data with respect to the region of interest includes compounding so as to acquire independent samples of an image point so as to reduce speckle.

64. A method of claim 63, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

65. A method of claim 63, wherein compounding includes obtaining the independent samples of an image point by respectively using different angular aspects.

66. A method of claim 63, wherein compounding includes obtaining the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

67. A method of claim 58, further including interpreting the co-registered data.

68. A method of claim 67, wherein interpreting the co-registered data includes automatically detecting data indicating the presence of malignant tissue within the region of interest.

69. A method of claim 67, wherein interpreting the co-registered data includes generating the co-registered data as image data.

70. A method of claim 69, wherein the data acquired by each modality is represented by a different color so that tissue within the region of interest is represented by a pseudo color representation.

71. A method of claim 58, wherein acquiring spatial data includes using a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data..

72. A method of claim 58, wherein acquiring spatial data includes compressing the tissue within the region of interest.

73. A method of claim 58, wherein acquiring spatial data includes using a 1D transceiver array.

74. A method of claim 58, wherein acquiring spatial data includes using a 2D transceiver array.

75. A method of claim 58, wherein there is a likelihood of detection when there is M-of-N detection.

76. A method of claim 58, wherein at least one of the probing methods is Doppler

ultrasound.

77. A method of claim 58, wherein at least one of the probing methods is electromagnetic probing of dielectric permittivity.

78. A method of claim 58, wherein at least one of the probing methods is diffusive IR probing of tissue properties.

79. A method of claim 58, wherein at least one of the probing methods is photo-acoustic probing of tissue properties.

80. A system for detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by one or more physical manifestations differentiating it from normal tissue, comprising:

a data acquisition subsystem constructed and arranged so as to acquire spatial data with respect to the region of interest using at least three separate probing methods, each sensing modality being of the type that senses the presence of malignant tissue within the region of interest by sensing at the presence of a physical manifestation associated with the malignant tissue; and

a data registration subsystem constructed and arranged so as to co-register the acquired spatial data from all of the probing methods so as to improve the receiver operating characteristics of detection performance.

81. A system of claim 80, wherein at least one of the probing methods is ultrasonic, and the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered signals from the tissue.

82. A system of claim 80, wherein at least one of the probing methods is ultrasonic, and the data acquisition subsystem includes a receiver constructed and arranged so as to receive transmitted signals through the tissue in the region of interest.

83. A system of claim 80, wherein at least one of the probing methods is ultrasonic, and the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered and transmitted signals through the tissue in the region of interest.

84. A system of claim 80, wherein the data acquisition subsystem is further constructed and arranged so as to acquire independent samples of an image point so as to compound data and reduce speckle.

85. A system of claim 84, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

86. A system of claim 84, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different angular aspects.

87. A system of claim 84, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

88. A system of claim 80, further including a data interpreter constructed and arranged so as to interpret the co-registered data.

89. A system of claim 88, wherein the data interpreter is constructed and arranged so as to automatically detect data indicating the presence of malignant tissue within the region of interest.

90. A system of claim 89, wherein the data interpreter is constructed and arranged so as to generate the co-registered data as image data.

91. A system of claim 90, wherein the data acquired by each modality is represented by a

different color so that image data of tissue within the region of interest is represented by a pseudo color representation.

92. A system of claim 80, wherein the data acquisition subsystem includes a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data..

93. A system of claim 80, wherein the data acquisition subsystem is constructed and arranged so as to compress the tissue within the region of interest.

94. A system of claim 80, wherein the data acquisition subsystem includes a 1D transceiver array.

95. A system of claim 80, wherein the data acquisition subsystem includes a 2D transceiver array.

96. A system of claim 80, wherein there is a likelihood of detection when there is M-of-N detection.

97. A system of claim 80, wherein there is a likelihood of detection when there is M-of-N detection.

98. A system of claim 80, wherein at least one of the probing methods is Doppler ultrasound.

99. A system of claim 80, wherein at least one of the probing methods is electromagnetic probing of dielectric permittivity.

100. A method of claim 80, wherein at least one of the probing methods is diffusive IR probing of tissue properties.

101. A method of claim 80, wherein at least one of the probing methods is photo-acoustic probing of tissue properties.

102. A system for detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by blood flow, micro-calcifications and tissue density so as to differentiate malignant tissue from normal tissue, comprising:

a data acquisition subsystem constructed and arranged so as to acquire spatial data with respect to the region of interest using at three ultrasonic probing methods for sensing each of blood flow, micro-calcifications and tissue density of tissue within the region of interest; and

a data co-registration subsystem constructed and arranged so as to co-register the acquired data from each of the probing methods so as to improve the receiver operating characteristics of detection performance.

103. A system of claim 102, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered signals from the tissue.

104. A system of claim 102, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive transmitted signals through the tissue in the region of interest.

105. A system of claim 102, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered and transmitted signals through the tissue in the region of interest.

106. A system of claim 102, wherein the data acquisition subsystem is further constructed and arranged so as to acquire independent samples of an image point so as to compound data and reduce speckle.

107. A system of claim 106, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by

respectively using different ultrasonic carrier frequencies.

108. A system of claim 106, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different angular aspects.

109. A system of claim 106, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

110. A system of claim 102, further including a data interpreter constructed and arranged so as to interpret the co-registered data.

111. A system of claim 110, wherein the data interpreter is constructed and arranged so as to automatically detect data indicating the presence of malignant tissue within the region of interest.

112. A system of claim 110, wherein the data interpreter is constructed and arranged so as to generate the co-registered data as image data.

113. A system of claim 112, wherein the data acquired by each modality is represented by a different color so that image data of tissue within the region of interest is represented by a pseudo color representation.

114. A system of claim 102, wherein the data acquisition subsystem includes a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data..

115. A system of claim 102, wherein the data acquisition subsystem is constructed and arranged so as to compress the tissue within the region of interest.

116. A system of claim 102, wherein the data acquisition subsystem includes a 1D transceiver array.

117. A system of claim 102, wherein the data acquisition subsystem includes a 2D transceiver array.

118. A system of claim 102, wherein there is a likelihood of detection when there is M-of-N detection.

119. A system of claim 102, wherein at least one of the probing methods is Doppler ultrasound.

120. A system for detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by blood flow, micro-calcifications and tissue density so as to differentiate malignant tissue from normal tissue, comprising:

a data acquisition subsystem is constructed and arranged so as to acquire spatial data with respect to the region of interest using at least three probing methods for sensing each of blood flow, micro-calcifications and tissue density of tissue within the region of interest, wherein one of the probing methods is photo-acoustic for sensing blood density, and at least two are ultrasonic for sensing micro-calcifications and tissue density, respectively; and

co-registering the acquired data from each of the probing methods so as to improve the receiver operating characteristics of detection performance.

121. A system of claim 120, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered signals from the tissue.

122. A system of claim 120, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive transmitted signals through the tissue in the region of interest.

123. A system of claim 120, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered and transmitted signals through the tissue in the region of interest.

124. A system of claim 120, wherein the data acquisition subsystem is further constructed and arranged so as to acquire independent samples of an image point so as to compound data and reduce speckle.

125. A system of claim 124, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

126. A system of claim 124, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different angular aspects.

127. A system of claim 124, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

128. A system of claim 120, further including a data interpreter constructed and arranged so as to interpret the co-registered data.

129. A system of claim 128, wherein the data interpreter is constructed and arranged so as to automatically detect data indicating the presence of malignant tissue within the region of interest.

130. A system of claim 128, wherein the data interpreter is constructed and arranged so as to generate the co-registered data as image data.

131. A system of claim 130, wherein the data acquired by each modality is represented

by a different color so that image data of tissue within the region of interest is represented by a pseudo color representation.

132. A system of claim 120, wherein the data acquisition subsystem includes a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data.

133. A system of claim 120, wherein the data acquisition subsystem is constructed and arranged so as to compress the tissue within the region of interest.

134. A system of claim 120, wherein the data acquisition subsystem includes a 1D transceiver array.

135. A system of claim 120, wherein the data acquisition subsystem includes a 2D transceiver array.

136. A system of claim 120, wherein there is a likelihood of detection when there is M-of-N detection.

137. A system of claim 120, wherein at least one of the probing methods is Doppler ultrasound.

138. A system for detecting the presence of malignant tissue within a region of interest within a living body, wherein the malignant tissue is characterized by blood density, blood flow, micro-calcifications and tissue density so as to differentiate malignant tissue from normal tissue, comprising:

a data acquisition subsystem constructed and arranged so as to acquire spatial data with respect to the region of interest using at least four probing methods for sensing each of blood density, blood flow, micro-calcifications and tissue density of tissue within the region of interest, and

a data registration subsystem constructed and arranged so as to co-register the acquired

data from each of the probing methods so as to improve the receiver operating characteristics of detection performance.

139. The method of claim 138, wherein one of the probing methods is photo-acoustic for sensing blood density, and at least three are ultrasonic for sensing blood flow, micro-calcifications and tissue density, respectively.

140. A system of claim 138, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered signals from the tissue.

141. A system of claim 138, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive transmitted signals through the tissue in the region of interest.

142. A system of claim 138, wherein the data acquisition subsystem includes a receiver constructed and arranged so as to receive backscattered and transmitted signals through the tissue in the region of interest.

143. A system of claim 138, wherein the data acquisition subsystem is further constructed and arranged so as to acquire independent samples of an image point so as to compound data and reduce speckle.

144. A system of claim 143, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies.

145. A system of claim 143, wherein the data acquisition subsystem is further constructed and arranged so as to obtain the independent samples of an image point by respectively using different angular aspects.

146. A system of claim 143, wherein the data acquisition subsystem is further

constructed and arranged so as to obtain the independent samples of an image point by respectively using different ultrasonic carrier frequencies and different angular aspects.

147. A system of claim 138, further including a data interpreter constructed and arranged so as to interpret the co-registered data.

148. A system of claim 147, wherein the data interpreter is constructed and arranged so as to automatically detect data indicating the presence of malignant tissue within the region of interest.

149. A system of claim 147, wherein the data interpreter is constructed and arranged so as to generate the co-registered data as image data.

150. A system of claim 149, wherein the data acquired by each modality is represented by a different color so that image data of tissue within the region of interest is represented by a pseudo color representation.

151. A system of claim 138, wherein the data acquisition subsystem includes a hand-held instrument positioned so as to be stationary relative to the region of interest during the acquisition of such spatial data.

152. A system of claim 138, wherein the data acquisition subsystem is constructed and arranged so as to compress the tissue within the region of interest.

153. A system of claim 138, wherein the data acquisition subsystem includes a 1D transceiver array.

154. A system of claim 138, wherein the data acquisition subsystem includes a 2D transceiver array.

155. A system of claim 138, wherein there is a likelihood of detection when there is M-

of-N detection.

156. A system of claim 138, wherein at least one of the probing methods is Doppler ultrasound.

157. An ultrasound transducer assembly adapted to contact a standoff region of a patient, comprising a piezoelectric transducer element deposited on a substrate, wherein the substrate includes a material so as to provide an acoustic matching layer between the piezoelectric transducer element and the standoff region.

158. An ultrasound transducer according to claim 157, wherein the substrate include silicon.

159. An ultrasound transducer according to claim 157, wherein the piezoelectric transducer element is deposited between two substrates.

160. An ultrasound transducer according to claim 159, wherein both substrates include silicon.

161. An ultrasound transducer adapted to contact a standoff region of a patient, comprising a piezoelectric transducer element disposed within a silicon resonator.

162. An ultrasound transducer according to clam 161, wherein the resonator includes at least two layers of silicon on opposite sides of the transducer element, and further including at least one layer of material disposed on one of the layers of silicon so as to aid in matching with the standoff region.